of the incomplete or corrupt packet. The transmitting node may send this control symbol, for example, when the in-transfer packet is known to be incomplete or corrupt. This may be the case, for example, if a packet is corrupted during construction or handling by the transmitting node. It may also be the case where the transmitting node has detected (via error codes), or been notified of (via a STOMP control symbol), an error in a packet received from an upstream node. The STOMP control symbol thus also functions as an end-of-packet code, e.g., signaling early termination of an in-transfer packet.

At the other end, a receiving node may then clear the received initial bytes ("'stomping" the faulty bytes); the receiving node may also issue a link-level PACKET_RETRY ACKNOWLEDGE control symbol to initiate a retry or retransmission of the affected bytes, or take other suitable action.

Thus, communications on the link are effected by a fast symbol passing scheme in which message packets are passed as a stream of symbols and the message-passing links check messages, generating and sending link-level control symbols within or between packets to quickly address message flow and assure that soft errors in the message packets are quickly detected and rectified without introducing collisions of the message handling steps.

The invention being thus disclosed and illustrative embodiments described herein, further variations, modifications and adaptations thereof will occur to those skilled in the art, and all such variations, modifications and adaptations are considered to be within the scope of the invention, as defined herein, and by the claims appended hereto and equivalents thereof.

What is claimed is:

1. A digital data system comprising

a plurality of nodes interconnected by at least one link,

the nodes being configured to communicate message packets on the link, a message packet having a format and a plurality of symbols that are transmitted by a first node on a link and received by another node on the link, wherein the message is aligned in relation in to a frame signal,

at least one of said first and said second nodes being configured to communicate a link level control symbol, the link level control symbol

being interposed between symbols of a message packet as an additional symbol to signal an adjacent node on the link,

such that the adjacent node receives the additional symbol before completion of the message packet to effect a link level control of message flow on the link.

2. A digital data system according to claim 1, wherein said additional symbol is asserted with a marker whereby the adjacent node detects the control symbol within the message packet to effect said link level control of message flow.

3. A digital data system according to claim 1, wherein at least one node includes at least one of

(i) an input buffer that at least temporarily stores a received message, and

(ii) an output buffer that at least temporarily stores a message for transmission,

and the control symbol effects a link level control to prevent buffer overflow.

4. A digital data system according to claim 1, wherein a message includes an error code for detecting corruption of a received message, and a receiving node that receives two portions of a message packet surrounding a control symbol realigns the received portions to apply the error code to the two surrounding portions of the message packet.

5. A digital data system according to claim 1, wherein a control symbol instructs a receiving node to reduce its message transmission rate.

6. A digital data system according to claim 1, wherein a control symbol includes a control code for identifying one of

i) a faulty message transmission, and

ii) a faulty message reception.

7. A digital data system according to claim 1, wherein a link is bi-directional, and interconnects a first node at one end of the link with a second node at another end of the link, said first and second nodes being full duplex nodes.

8. A digital data system according to claim 4, wherein a control symbol instructs an adjacent node to reduce its message transmission rate by transmitting a specified number of idle states so as to match receiver capacity to transmission rate.

9. A digital data system according to claim 1, wherein a node transmits the interposed control symbol in alignment with a symbol boundary in a message packet, whereby received data may be passed through a register of fixed size and the control symbol is discerned via the marker, permitting alignment of portions of a message packet irrespective of interposition of the control symbol therebetween.

10. A digital data system according to claim 1, comprising a plurality of links forming an interconnect fabric among plural devices, the links interconnecting, and wherein each link has a first node attached to one end of the link and a second node attached to another end of the link, the nodes cooperating to route messages along interconnected links between devices of the system.

11. A digital data system comprising

a plurality of nodes interconnected by at least one link,

the nodes being configured to communicate message packets on the link between a first node on a link and a second node on the link, a message packet having a format and including a plurality of symbols, wherein the message packet is aligned in relation in to a frame signal,

at least one of said first and said second nodes being configured to communicate a link level THROTTLE control symbol effective to induce a the other of said nodes receiving said THROTTLE control symbol to

i) control message transmission of said receiving node

ii) controlling said transmission to space out transmission of data messages to regulate flow in said link between the first receiving node and the transmitting node.

12. A digital data system according to claim 11, wherein the THROTTLE control symbol instructs a transmitting node to transmit at least one idle state symbol between data messages.

13. A digital data system according to claim 12, wherein the THROTTLE control symbol instructs a transmitting node to transmit a specified number of idle state symbols.

14. A digital data system according to claim 13, wherein the THROTTLE control symbol includes an override code to instruct a transmitting node to resume message transmission.

15. A digital data system according to claim 11, wherein said at least one node is configured to transmit the THROTTLE control symbol responsive to buffer state and thereby reduce incoming data rate.

16. A digital data system comprising

a plurality of nodes interconnected by at least one link,

the nodes being configured to communicate message packets on the link between a first node on a link and a second node on the link, a message packet having a format and including a plurality of symbols, wherein the message packet is aligned in relation in to word boundaries,

adjacent ones of said first and second nodes being configured to communicate an IDLE state control symbol effective when transmitted by a transmitting node to reduce rate of data flow in said link to a receiving node while maintaining communication between the receiving node and the transmitting node.

17. The digital data system of claim 16, wherein the transmitting node transmits data from an output section, and transmits the IDLE state control symbol so as to lower its data output rate to match a rate at which data is available to said output buffer.

18. The digital data system of claim 16, wherein the transmitting node transmits the IDLE state control symbol interposed within a message packet to implement a link level flow control of message data to an adjacent node receiving the message packet.

19. The digital data system of claim 16, wherein the transmitting node transmits the IDLE state control symbol in response to a control symbol received from a adjacent receiving node.

20. The digital data system of claim 16, wherein the control symbol received from a receiving node is a control symbol embedded in a message packet sent by the adjacent receiving node.

21. A digital data system comprising

adjacent first and a second nodes interconnected by a link of a link interconnect system,

said nodes being configured to pass data messages therebetween over said link, a data message including at least one message packet, and said nodes also being configured to pass at least one link-level control symbol for control of a link-level message mechanism

wherein at least one of said first and second nodes sends a link level control symbol over the link indicative of a message fragment to thereby prevent propagation of faulty messages in the link interconnect system.

22. The digital data system of claim 21, wherein the link level control symbol is a STOMP symbol sent responsive to an error in a message sent on the link, an adjacent node receiving the STOMP control initiating a message retry acknowledgement signal to initiate retransmission of the affected message.

23. The digital data system of claim 21, wherein the link level control symbol is a STOMP symbol sent by a transmitting node to an adjacent receiving node, the STOMP control symbol indicating an end of an in-process message packet transmission.